

Efficient High Power 2 micron Tm3+-Doped Fiber Laser, Phase II

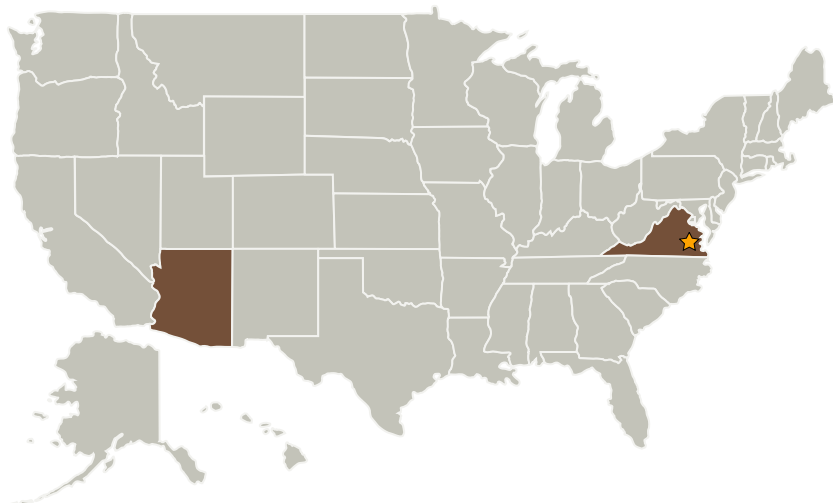
Completed Technology Project (2004 - 2006)



Project Introduction

This proposal is for the development of new Tm3+ doped germanate glass fibers for efficient high power 2-micron fiber lasers capable of generating an output power of up to hundreds watts. We propose to use Tm3+ doped germanate glass fibers because silica glass fiber is not the ideal host for lasers at wavelength of 2-micron and longer. Germanate glass exhibits lower phonon energy compared to silica glass, increasing the quantum efficiency of 3F4 level of Tm3+ ions. Importantly, Tm3+ can be highly doped into germanate glasses, which results in so called cross-relaxation, dramatically improving the quantum efficiency. We will develop double-clad single mode germanate glass fibers with greater than 6wt% Tm3+ concentration to take full advantages of this Tm3+ cross-relaxation process, developing highly efficient fiber lasers at 2-micron. This type of fiber laser is useful for LIDAR applications, can also be used to pump Ho3+ doped crystals to generate extremely high power 2-micron lasers.

Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---------------------------------|-------------------------|-------------|-------------------|
| ★ Langley Research Center(LaRC) | Lead Organization | NASA Center | Hampton, Virginia |
| NP Photonics, Inc. | Supporting Organization | Industry | Tucson, Arizona |



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Arizona

Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers